RCRA CLOSURE PLAN
FOR
WAX/SOLVENT STORAGE TANK

RESOURCE CONSERVATION AND RECOVERY ACT
CONCENTRATED WASTE TREATMENT PLANT

November 1990

Prepared for:

United Technologies Corporations
Pratt & Whitney
400 Main Street
East Hartford, Connecticut
EPA ID # CTD990672081

Prepared by:
Loureiro Engineering Associates
100 Northwest Drive
Plainville, CT 06062

Comm. No. 971-10

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ACRONYMS

CTDEP:	Connecticut Department of Environmental Protection
CWTP:	Concentrated Waste Treatment Plant
EPA:	U.S. Environmental Protection Agency
MCL:	Maximum Contaminant Level
P&W:	Pratt & Whitney
QA/QC:	Quality Analysis/Quality Control
RCRA:	Resource Conservation and Recovery Act
TCLP:	Toxicity Characteristic Leaching Procedure
TSDF:	Treatment Storage Disposal Facility

A. INTRODUCTION

This Closure Plan is provided for the wax/solvent storage tank located at the Concentrated Waste Treatment Plant of United Technologies - Pratt & Whitney East Hartford facility, EPA ID No. CT D 990672081. Closure of this unit will be conducted in accordance with all applicable RCRA regulations, and will:

1) Minimize the need for further maintenance, and;

2) Control, minimize or eliminate to the extent necessary to protect human health and the environment, the post closure escape of hazardous waste, hazardous constituents, leachate, or contaminated run-off to the groundwater, surface water or the atmosphere.

In subsequent sections, this closure plan provides a description of methods to be applied and precautions to be taken in closing the wax/solvent tank. Specific closure activities are described in detail and a trackable closure schedule and cost estimate are provided.

Upon completion of closure, P&W will submit a certification by both P&W and an independent registered professional engineer to the Regional Administrator and the DEP Commissioner that the facility has been closed in accordance with the specifications in the approved closure plan. The closure certification will include all other pertinent analytical data as well as the following:

- Photographic records of the closure documenting each construction step of the closure process
- Contractors daily log

- A list of any departure from the approved plan with rationales in accordance with 40 CFR 264.112(c).

In subsequent sections, this Closure Plan provides a detailed description of specific procedures to be followed and precautions to be taken in closing the wax/solvent storage tank.

B. FACILITY DESCRIPTION

P&W East Hartford generates a variety of hazardous wastes and receives wastes from P&W satellite plants located in Connecticut, Maine and New York. Currently these wastes are managed in eleven (11) storage tanks (8 above ground and 3 underground) and five (5) container storage areas all located within an area known as the Concentrated Waste Treatment Plant (CWTP). These operations are located in an area near the northern end of the East Hartford plant complex.

Pratt & Whitney is planning to upgrade this facility. Design work is in progress and construction is planned for 1991. Wastes generated on-site are also managed at other locations within the facility in containers and tanks for less than ninety (90) days.

The wax/solvent tank was once used for hazardous waste accumulation and storage and had the capability to feed directly to an incinerator. The incinerator has been removed and the wax/solvent tank has become obsolete and will therefore be closed

C. WAX/SOLVENT TANK DESCRIPTION

The wax/solvent storage tank is located in the CWTP, in the same building as the former Burn-Zol incinerator, which is also presently being closed under a closure plan approved by the CTDEP and EPA. The tank was used to store wax/solvent sludges which accumulated at the bottom of a still where used solvents, such as 1,1,1-trichloroethane and perchloroethylene, were distilled for reuse. The tank was used only for storage of the wax/solvent mixture. It was heated to avoid precipitation of the wax from the mixture. The tank had a cover to minimize solvent evaporation and an air duct to vent the tank. The tank was located in a pit, which served as a secondary containment.

An above ground wax/solvent feed line was used to connect the wax/solvent tank directly to the incinerator, which was located in the same building. The wax/solvent feed line leading to the incinerator was actually used on four separate occasions, each involving trial test burns of the wax/solvent waste stream in the incinerator. These tests were performed on 3-31-82, 12-14-82, 12-13-83, and 5-30-84. Each of these tests indicated deficiencies related to the operation of the incinerator and inadequate scrubber performance. A decision was made in the first quarter of 1985 to postpone plans for additional trial burns, and subsequently, to abandon the incinerator permitting process and consider closure alternatives. As already mentioned previously, the incinerator components,

and wax/solvent feed line attached to the incinerator, have been removed and the incinerator area is being closed as part of a CTDEP and EPA approved closure plan.

D. GENERAL CLOSURE REQUIREMENTS

a. General

This section presents the general closure requirements pertaining to closure of the wax/solvent storage tank. A detailed description of the specific activities to be followed during closure is given in the following section (Section E). It is expected that at the time of closure, the tank will contain insignificant amounts of hazardous waste. Closure will be completed within 180 days of the starting date.

Closure activities will involve removal of any hazardous waste remaining in the tank; dismantling and disposal of tank and ancillary equipment; decontamination of the containment pit; confirmatory sampling and analysis; and data evaluation and closure certification by a licensed professional engineer. Specific procedures for sample analysis and data evaluation are provided in Section F of this plan while a closure cost estimate is presented in Section G.

b. Closure Requirements

1. Health and Safety - The decontamination crew will consist of a minimum of two individuals who will be adequately clothed, including self-contained breathing apparatus, if required, and coveralls. Supervision of the decontamination process will include the individual(s) responsible for operation of the TSDF.

The primary basis for the level of personnel protection selected is determined by:

- The type, toxicity, measured concentration, and permissible exposure limits of the chemical substances.

- The potential or measured exposure to substances in the air, splashes of liquids, or other direct contact with materials due to the work being performed.

The personnel protective equipment used to protect the body against chemical hazards is divided into four categories according to the degree of protection:

- Level A - Will be worn when the highest level of respiratory, skin, and eye protection is needed.
- Level B - Will be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection is needed.
- Level C - Will be worn when the types of airborne substances are known, the concentrations have been measured, and the criteria for using air-purifying respirators are met.
- Level D - This level is used where no respiratory or skin hazards are present. Level D protection is primarily a work uniform providing minimal protection

It is not anticipated that personnel will need to use Levels A or B.

2. Sudden or Non-Sudden Release, or Fire Hazard - The decontamination process will be considered as an activity presenting a high risk potential for release of hazardous waste or fire/explosion hazard. As such, the appropriate mechanisms of the Contingency Plan will be ready for activation.

3. Timetable - Completion of closure will be within 180 days of agency approval of the closure plan. The schedule for closure including milestone dates follows:

DAY	ACTIVITY
0	EPA and CTDEP approved closure plan.
90	All hazardous wastes disposed of off-site at permitted facilities. Tank and appurtenances removed and disposed of off-site at permitted facilities.
100	Inspection for residual wastes completed and all damaged areas identified. Samples collected from damaged areas and analyzed appropriately.
120	Floors and equipment cleaned and rinsed. Confirmatory chip samples taken of the concrete containments.
150	Floor and piping repaired and/or sealed as necessary for further use.
180	Completion of closure.

All final closure activities will be supervised and certified by an independent registered professional engineer, in addition to P&W personnel.

P&W may require an extension for closure time depending on the season that closure begins.

4. Certification - The following certification should be submitted to the EPA Region I Administrator and the Commissioner of CT DEP upon completion of closure:

"I,_____, for Pratt & Whitney, United Technologies
(Name)

Corporation, owner and operator of _____,
(Site)

a hazardous waste storage area and I, _____, P.E.,
(Name)

employed by _____, certify by means of our
(Firm)

signatures, that the facility named above has been closed in accordance with the method specified by the Closure Plan, and attached hereto. Closure was completed on _____, after receiving the final
(Date)

volume of material on _____".
(Date)

E. DESCRIPTION OF CLOSURE ACTIVITIES

This section describes in detail the specific procedures to be applied and precautions to be taken in closing the wax/solvent storage tank. The hazardous waste inventory expected to be present in the tank at the time of closure is minimal, limited to wax residues on the side of the tank.

The wax/solvent tank closure process concerns only the tank, associated waste feed or vent lines, and the containment pit and immediate adjacent area potentially contacted by tank operations. The following detailed procedures describe the work.

1. A Health and Safety Plan, specific to the wax/solvent storage tank will be prepared to cover the closure activities to be performed.
2. Any wax residues remaining on the sides, top and bottom of the tank, on the tank components, and on the containment pit will be removed to the maximum extent possible, by brushing, cleaning and scraping. The resulting accumulation of waste residue along with any contaminated disposable clothing will be drummed and treated as hazardous waste. Any tools used during residue removal will be decontaminated using an industrial grade non-phosphate detergent and water solution with a plant tap water rinse. All rinsate will be collected and treated as a hazardous waste liquid at the CWTP.

3. Once all hazardous waste inventory has been removed (to the extent possible), the tank, tank accessories and above ground air ducts and piping will be dismantled and disposed of as hazardous waste via a licensed waste hauler to a permitted TSDF. Disassembly will consist of manual dismantling and/or the use of powered equipment. Both hot or cold cutting techniques may be used. The size of stockpiled components will be directly influenced by the disposal facilities requirements for landfilling. It is anticipated that all piping will be cut into four foot sections and that larger components will not exceed 10 feet in any dimension.

4. After removal of the tank components, the concrete pit which used to serve as a secondary containment for the tank will be shotblasted or scarified. The potential for fugitive dust emissions will be minimized by utilizing equipment which immediately contains all generated residue. This residue will be collected, stored and treated as hazardous waste.

5. The containment area will subsequently be scrubbed with either a solution containing 5 percent sodium carbonate and 5 percent trisodium phosphate or simply a 5 percent solution of trisodium phosphate. The area will then be thoroughly rinsed with water. Spent decontamination solutions or rinsewaters will be collected in existing sumps or will be contained through the use of dikes

to prevent wash water migrating into clean areas. This rinsate will be collected using a wet/dry vacuum then stored and treated as a hazardous waste.

6. All equipment used in closure activities will either be decontaminated or collected and disposed of as hazardous waste. Small manual tools will be decontaminated using an industrial grade non-phosphate detergent and water solution. Equipment used during decontamination, such as brushes, gloves, disposable suits, etc., will be collected in a 55-gallon drum and disposed of as hazardous waste using licensed transporters and permitted disposal facilities. Portions of larger tools (i.e. lifts, hoists) which have come in contact with the waste will be decontaminated by steam cleaning. All rinsate generated during decontamination activities will be collected and treated as hazardous waste.

7. Once decontamination has been completed as described above, the wax/solvent storage area will be inspected for cracks or other visible signs of deterioration. If cracks or signs of deterioration are observed then the sampling plan presented below will be modified to include a representative portion of these areas.

9. If no cracks, or visible signs of deterioration are found, then non-statistical "judgement sampling" of potentially contaminated areas based on visual observations, is not possible. Instead, verification sampling will be performed according to the following procedure:

The containment area after decontamination will be gridded and sampled at locations corresponding to randomly selected grid nodes. The area to be gridded includes the floor of the containment pit, which will represent worst case conditions, and the area immediately adjacent to the tank pit inside the building, that could potentially have been affected by the tank operations (Refer to Figure 1). The size of the grid interval is determined by this generally accepted mathematical formula:

$$GI = (A/3.14)^{0.5}/2, \text{ where:}$$

GI = grid interval, ft

A = area to be gridded, sq. ft.

The calculated value for the grid interval is then rounded off to the nearest integer and the area is gridded.

The number of samples (n) to be obtained from each slab is determined by the square root of the number of grid nodes.

A random number table or generator is typically used to determine which grid nodes or grid areas will be sampled.

Table 1 outlines the calculations of the number of verification samples required to be collected from the wax/solvent storage tank area to generate statistically viable data.

The number of grid samples shown in Table 1 is the number of samples statistically required. A random number table procedure

TABLE 1
WAX/SOLVENT STORAGE TANK
VERIFICATION SAMPLING

Process	Area (Sq. Ft)	Grid Interval	No. of Grid Nodes	No. of Grid Samples	No. of Non-Statistical Samples	Total No. of Samples
Wax/Solvent Storage Tank	240	4	20	4	*	4 or more

* Refers to samples to be collected from suspected hot spots or areas showing visible signs of deterioration, staining, discoloration or cracks in the concrete, as determined in Step No. 7 of the closure activities.

was used to calculate the exact location of these samples, which are shown in Figure 1. In addition to these samples, a representative number of samples will be collected from obviously contaminated spots, cracks or other areas that show signs of severe deterioration. These samples, if any, will be in addition to those shown in Figure 1.

All samples will consist of concrete chip samples collected with an air chisel or similar tool. The portion of the tool in direct contact with the concrete will be cleaned between samples using an industrial non-phosphate detergent wash and a tap water rinse.

The resulting concrete chips will be transferred directly into laboratory supplied glassware. The field QA/QC program for concrete chip samples will consist of one field duplicate and one trip blank to accompany the samples to the laboratory. Immediately following sample collection each sample will be labeled and placed in an iced cooler. The samples will be transported under full chain-of-custody to a State of Connecticut approved laboratory.

The analytical testing and determination procedures are presented in Section C of the Closure Plan.

If based on an evaluation of the analytical data (comparison to available background levels and to health/risk based levels) the decontamination effects are deemed incomplete, the decontamination will be repeated until follow-up sampling

P & W – EH
RCRA Closure Plan
Wax/Solvent Stor. Tank
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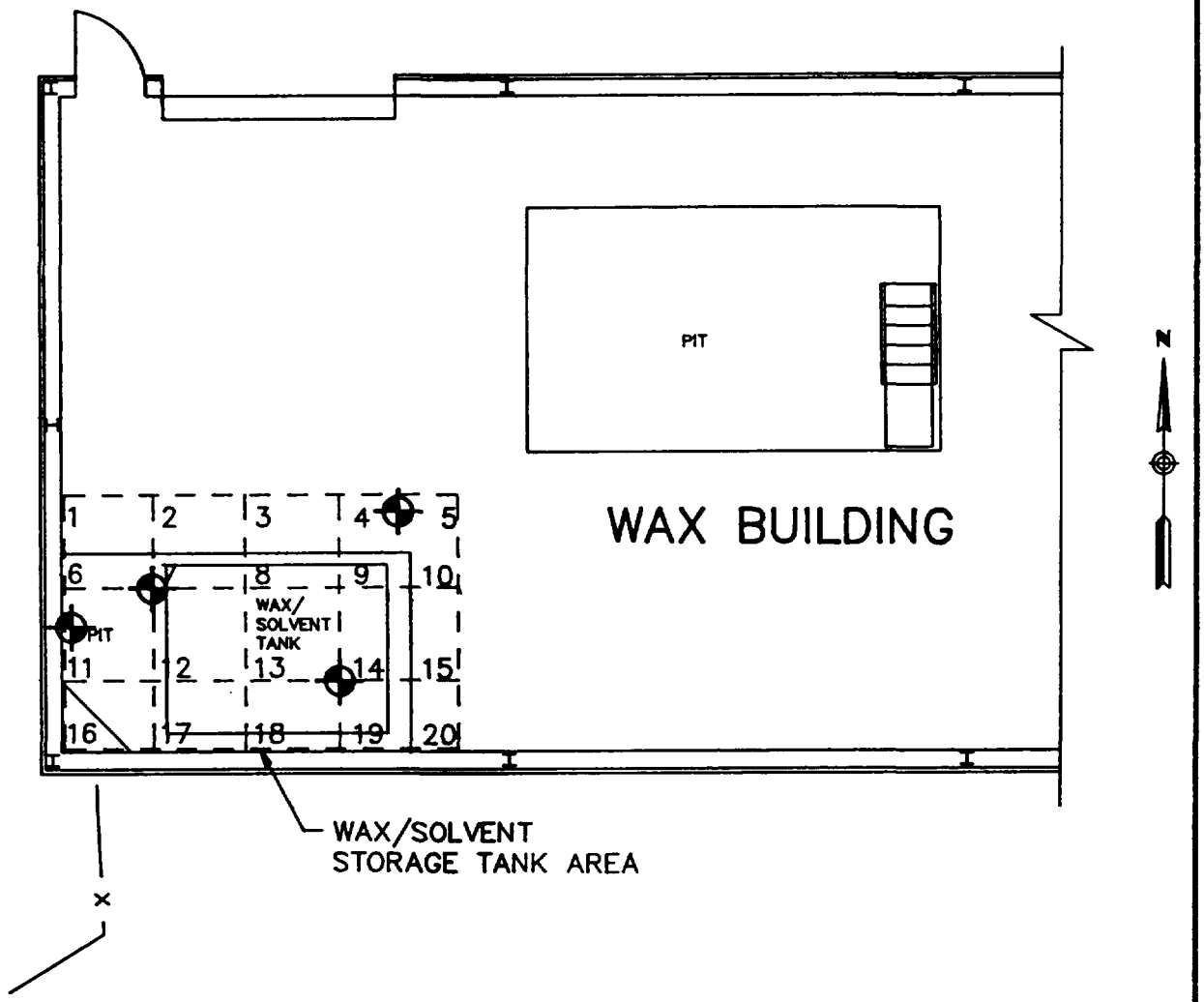

LEGEND

CONCRETE SAMPLING LOCATION

LEA LOUREIRO ENGINEERING ASSOCIATES
CONSULTING ENGINEERS — PLAINVILLE, CT

RCRA PART B PERMIT APPLICATION
SAMPLING LOCATIONS
FIGURE 1

COMM.NO. 971-10

DWG. BY	APP. BY	SCALE	DATE
JJL	JL	1/8" = 1'-0"	11/12/90

demonstrates that parameters are at or below health/risk standards or are consistent with background levels. Any concrete chip sampling areas which exhibit levels consistent with background and either above or below health/risk levels will be considered representative of ambient background levels thus decontamination efforts will be deemed complete.

9. The certification of closure will be completed as discussed in Section B(b)(4) of this Closure Plan. Within 60 days of completion of all closure activities, the Certification of Closure will be sent by registered mail to the EPA Regional Administrator and the Commissioner of the Connecticut Department of Environmental Protection.

concrete chip sampling areas which exhibit levels consistent with background and either above or below health/risk levels will be considered representative of ambient background levels thus decontamination efforts will be deemed complete.

9. The certification of closure will be completed as discussed in Section B(b)(4) of this Closure Plan. Within 60 days of completion of all closure activities, the Certification of Closure will be sent by registered mail to the EPA Regional Administrator and the Commissioner of the Connecticut Department of Environmental Protection.

F. ANALYSIS AND DATA EVALUATION

This section presents the analytical methods and QA/QC procedures to be followed during sample analysis. Data evaluation will be based on a comparison of the data collected with background levels and/or health/risk based standards.

a. Analytical Parameters

A specific analytical parameter list has been developed for concrete chip samples collected during closure of the wax/solvent storage tank. The list, presented in Table 2, is representative of all listed hazardous waste constituents present in the wax/solvent mixture, the only waste stream stored in the wax/solvent storage tank. In addition to the constituents listed in Table 2, the characteristics hazardous waste parameters of corrosivity and TCLP (metals only) have been deemed applicable and are therefore included. The aforementioned parameters were taken from the approved closure plan for the incinerator as both units handled the same waste stream with the exception of cyanide wastes which were not placed in the wax/solvent tank.

The analytical methods presented in Table 2 have been selected from the third edition of EPA's Publication SW-846 - "Test Methods for Evaluating Solid Waste". The designated laboratory will follow all applicable internal QA/QC procedures outlined in SW-846.

TABLE 2
SPECIFIC LIST OF ANALYTICAL PARAMETERS

Analytical Parameters	Solid Mass Analysis (Concrete Chip Samples)
Metals	
Arsenic	3050/7060
Barium	3050/6010
Cadmium	3050/6010
Chromium (Total)	3050/6010
Chromium VI	----/7196
Copper	3050/6010
Lead	3050/6010
Mercury	3050/7471
Nickel	3050/6010
Selenium	3050/7740
Silver	3050/6010
Volatile Organic Compounds	
Carbon Tetrachloride	5030/8010
1,1,-Dichloroethylene	5030/8010
Methylene Chloride	5030/8010
Tetrachloroethylene	5030/8010
1,1,1-Trichloroethane	5030/8010
Trichloroethylene	5030/8010

Notation
*5030/8010 - preparation method/analytical method

b. Data Validation

Upon receipt of the analytical data, an initial evaluation of the results will be performed through data validation. Data validation includes a review of field QA/QC procedures (i.e. trip blanks, field duplicates) and laboratory QA/QC procedures (i.e. holding times, blind duplicate analysis, surrogate recoveries). Data points that are not adequately supported by the QA/QC procedures will be referred to the sampling team and/or the laboratory for appropriate corrective actions.

Upon completion of data validation, the results will be compared to background data points and the relevant and appropriate regulatory standards and criteria. An explanation of how this will be performed for each sample media (aqueous or solid) is presented below.

c. Data Evaluation

As previously stated, decontamination of the wax/solvent storage tank will be demonstrated complete by concrete chip sampling and comparison to regulatory and/or background levels.

Analytical data will be generated for the concrete on a mass analysis basis for all the parameters listed in Table 2. The hazardous waste characteristic of toxicity will be determined by performing the TCLP test for selected metals (arsenic, barium, cadmium, chromium (T), lead, mercury, selenium, silver).

The background levels to be used in data evaluation will be identical to the ones established recently during closure of the Burn-Zol incinerator. The incinerator was located in the same building as the wax/solvent storage tank and valid background data has already been generated.

Analytical results on concrete chip samples for TCLP metals will be compared to the regulatory levels specified in 40 CFR 261.3. If any parameter exceeds the applicable regulatory level then decontamination will be deemed incomplete in the area of that sample. If this circumstance occurs for any of the concrete chip samples collected, decontamination efforts will continue until follow-up sample data achieves the applicable target standard.

In addition to the evaluation on the basis of TCLP (characteristic of toxicity), data evaluation against health/risk based standards will be performed for the contaminants detected. This evaluation will only be performed for parameters that have health/risk based standards associated with them as listed in EPA's publication "RCRA Facility Investigation Guidance", interim final (EPA 530/SW-89-31), dated May, 1989.

Table 3 summarizes the health/risk based standards for the parameters of concern, according to which the concrete chip samples will be evaluated. Evaluation will consist of comparing identified constituent levels to available background data and to health/risk based standards. Decontamination efforts will be deemed incomplete if

TABLE 3

HEALTH/RISK - BASED STANDARDS
CONCRETE CHIP SAMPLING

CONSTITUENT	CONCENTRATION (mg/kg)
Arsenic	0.02
Barium	900
Cadmium	*
Chromium (VI)	90
Copper	*
Lead	*
Mercury	*
Nickel	300
Selenium	*
Silver	50
Carbon Tetrachloride	5.4
1,1-Dichloroethylene	12
Methylene Chloride	93
Tetrachloroethylene	140
1,1,1-Trichloroethane	7000
Trichloroethylene	64

Risk levels obtained from RCRA Facility Investigation (RFI) Guidance Document (EPA Publication 530/SW-89-031).

*No risk levels identified

constituent levels exceed health/risk based standards with the exception of samples that demonstrate such levels but are consistent with ambient background levels. Decontamination efforts must continue until follow-up sampling demonstrates that parameters are at or below health/risk based standards or are consistent with background levels. Any concrete chip sampling areas which exhibit levels consistent with background and either above or below health/risk based levels will be considered representative of ambient background levels thus decontamination efforts will be deemed complete.

D. CLOSURE COST ESTIMATE

The closure cost estimate for the wax/solvent storage area is estimated to be $81,000 in 1990 dollars. A breakdown of the costs is included in Table 4. All costs assume performance of closure activity by a qualified third-party contractor. The estimates assume that no appreciable waste will be present in the tank at closure.

TABLE 4

CLOSURE COST ESTIMATE

	ACTIVITY	COST
1.	Health & Safety Plan	$ 3,000
2.	Removal of Hazardous Waste Inventory	$ 5,000
3.	Dismantling and Disposal of Tank and Ancillary Equipment	$20,000
4.	Decontamination of Containment Pit	$20,000
5.	Verification Sampling and Analysis	$16,000
6.	Data Evaluation and Closure Certification	$ 5,000
	Subtotal	$69,000
	Insurance (7%)	$ 5,000
	Contingency (10%)	$ 7,000
	TOTAL	$81,000

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON MASSACHUSETTS 02203-2211

September 11, 1989

APPROVAL

Mr. John G. Whitehead, Plant Manager
UTC Pratt & Whitney Aircraft
400 Main Street
East Hartford, Connecticut 06108

RE: Approval of partial closure plan for incinerator at Pratt & Whitney Aircraft, East Hartford, Connecticut CTD 990672081

Dear Mr. Whitehead:

The partial closure plan dated May 2, 1988 as amended July 7, 1989 and August 17, 1989 that was prepared for Pratt & Whitney Aircraft, 400 Main Street, East Hartford, Connecticut has been reviewed by the Connecticut Department of Environmental Protection (DEP) and the U.S. Environmental Protection Agency (EPA) Region I.

The DEP and EPA have determined that these plans comply with the closure requirements pursuant to Section 22a-449(c)-29 of the regulations of Connecticut State Agencies and with Title 40 Part 265 Subparts G and O of the Code of Federal Regulations. Both agencies hereby approve the plan as submitted provided the following conditions are met:

1. Pratt and Whitney Aircraft shall contact DEP/EPA for review of the following closure plan events at least 14 days prior to their implementation:

   a. Prior to sampling for hazardous constituents.

2. The background decontamination standard must be the lowest value obtained of the two samples taken.

All work shall be subject to the review of the DEP and the EPA. They shall decide all questions as to interpretations of approved plans and specifications.

Mr. John C. Whitehead
UTC Pratt & Whitney Aircraft
Approval

September 11, 1989

The Regional Administrator of the EPA and the Commissioner of the DEP may authorize changes to the approved closure plan upon written request pursuant to 40 CFR 265.112(c).

This approval does not relieve the facility of the obligation to obtain any other authorization as may be required by other provisions of the Connecticut General Statues, Regulations of Connecticut State Agencies, Code of Federal Regulations, or Federal Statutes.

Sincerely,

Stephen W. Hitchcock, Director
Hazardous Material Management Unit
Connecticut Department of
Environmental Protection

Merrill S. Hohman, Director
Waste Management Division
Region I
U. S. Environmental
Protection Agency